

Owner's Manual & Safety Instructions

Save This Manual Keep this manual for the safety warnings and precautions, assembly, operating, inspection, maintenance and cleaning procedures. Write the product's serial number in the back of the manual near the assembly diagram (or month and year of purchase if product has no number). Keep this manual and the receipt in a safe and dry place for future reference.

24d

PREDATOR™

43cc 2-STROKE GAS POWERED CULTIVATOR



58169

Visit our website at: <http://www.harborfreight.com>
Email our technical support at: productsupport@harborfreight.com
Email our engine support at: predator@harborfreight.com

⚠ DANGER

Using an engine indoors
CAN KILL YOU IN MINUTES.

Engine exhaust contains carbon monoxide.
This is a poison you cannot see or smell.



NEVER use inside
a home or garage,
EVEN IF doors and
windows are open.



Only use OUTSIDE
and far away from
windows, doors,
and vents.

When unpacking, make sure that the product is intact and undamaged. If any parts are missing or broken, please call 1-888-866-5797 as soon as possible.

⚠ WARNING

Read this material before using this product.
Failure to do so can result in serious injury.
SAVE THIS MANUAL.

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Specifications

Cultivator Specifications






Tilling Depth	2" min – 6" max
Tilling Width	4" min – 9" max
Drive Type	Worm Gear Drive
Drive Actuation	Throttle Lever Operated
Depth Adjustment Steps	5
Overall Dimensions	31-1/2" L x 18-1/2" W x 40" H
Wheels	7" Diameter x 1-1/2" W
Weight	32.1 Pounds

Engine Specifications




Displacement		43cc
Engine Type		Horizontal Single Cylinder 2-stroke
Cooling System		Forced air cooled
Fuel	Type	87+ octane stabilizer-treated unleaded gasoline containing no more than 10% ethanol (E10) mixed with 2-stroke oil (see below)
	Capacity	0.27 Gallon
Oil	Type	2-stroke oil designed specifically for mixing with gasoline. Must meet either JASO M345 FD or ISO-L-EGD requirements for air-cooled engines, synthetic
	Ratio	50:1 gasoline-to-oil ratio 2.6 oz oil per gallon of gasoline
Sound Level at 1 meter		95 dB
Bore x Stroke		40 mm x 34 mm
Compression Ratio		7.9:1
Rotation viewed from PTO (power takeoff - the output shaft)		Counterclockwise
Spark Plug	Type	Torch® L8RTC
	Gap	0.0196" – 0.0275"
Speed	Idle	2800 ± 280 RPM




The emissions control system for this Engine is warranted for standards set by the U.S. Environmental Protection Agency. For warranty information, refer to the last pages of this manual.

WARNING SYMBOLS AND DEFINITIONS

	This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.
	Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
	Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
	Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
	Addresses practices not related to personal injury.

Symbol Definitions

Symbol	Property or Statement
RPM	Revolutions Per Minute
HP	Horsepower
	WARNING marking concerning Risk of Eye Injury. Wear ANSI-approved safety goggles with side shields.
	Read the manual before set-up and/or use.
	WARNING marking concerning Risk of Hearing Loss. Wear hearing protection.

Symbol	Property or Statement
	WARNING marking concerning Risk of Respiratory Injury. Operate engine OUTSIDE and far away from windows, doors, and vents.
	WARNING marking concerning Risk of Fire while handling fuel. Do not smoke while handling fuel.
	WARNING marking concerning Risk of Fire. Do not refuel while operating. Keep flammable objects away from engine.

IMPORTANT

Safe Operation Practices for Walk-Behind Powered Rotary Tillers and Hand Supported Cultivators

SAFETY



WARNING! Read all instructions.

Failure to follow all instructions listed below may result in fire, serious injury and/or DEATH.

The warnings and precautions discussed in this manual cannot cover all possible conditions and situations that may occur. It must be understood by the operator that common sense and caution are factors which cannot be built into this product, but must be supplied by the operator.

SAVE THESE INSTRUCTIONS

Set up Precautions

1. Thoroughly inspect the area where the equipment is to be used and remove all foreign objects.
2. Disengage all clutches and shift into neutral before starting the engine.
3. Gasoline fuel and fumes are flammable, and potentially explosive. Take the following precautions:
 - a. Store fuel in containers specifically designed for this purpose.
 - b. Refuel outdoors only and do not smoke while refueling.
 - c. Add fuel before starting the engine. Never remove the cap of the fuel tank or add fuel while the engine is running or when the engine is hot.
 - d. If fuel is spilled, do not attempt to start the engine but move the machine away from the area of spillage and avoid creating any source of ignition until fuel vapors have dissipated.
 - e. Replace all fuel tank and container caps securely.
4. Have multiple ABC class fire extinguishers nearby.
5. Do not operate the equipment without wearing adequate protective clothing. Wear protective footwear that will improve footing on slippery surfaces.
6. Never attempt to make any adjustments while the engine is running.
7. Operation of this equipment may create sparks that can start fires around dry vegetation. A spark arrestor may be required. The operator should contact local fire agencies for laws or regulations relating to fire prevention requirements.
8. Set up and use only on a flat, level, well-ventilated surface.
9. Wear ANSI-approved safety goggles, heavy-duty work gloves, and dust mask/respirator during set up.
10. Use only lubricants and fuel recommended in the Specifications chart of this manual.
11. **NEVER operate above or near any electrical cables, gas pipes, or any other utility lines.** Contact your local utility company before using the Cultivator.
12. **Thoroughly inspect the area where the Cultivator is to be used.** Beware of possible buried obstacles such as cable, conduit, irrigation lines, and landscape fabric. Remove all large sticks, stones, wires, or other foreign objects.

SETUP


OPERATION

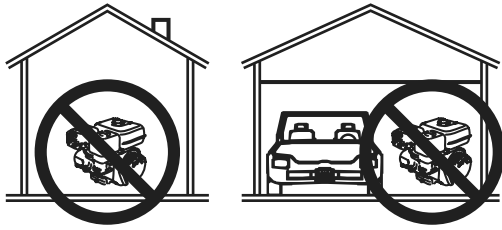
Training

1. Read the operating and service instruction manual carefully. Be thoroughly familiar with the controls and the proper use of the equipment. Know how to stop the unit and disengage the controls quickly.
2. Never allow children to operate the equipment. Never allow adults to operate the equipment without proper instruction.
3. Keep the area of operation clear of all persons, particularly small children, and pets.
4. Keep in mind that the operator or user is responsible for accidents or hazards occurring to other people, their property, and themselves.

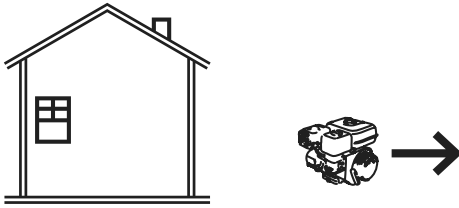
MAINTENANCE

Operating Precautions

1.  **CARBON MONOXIDE HAZARD**
Using an engine indoors
CAN KILL YOU IN MINUTES.
Engine exhaust contains carbon monoxide. This is a poison you cannot see or smell.



NEVER use inside a home or garage, EVEN IF doors and windows are open.



Only use OUTSIDE and far away from windows, doors, and vents.

- Do not put hands or feet near or under rotating parts.
- Exercise extreme caution when operating on or crossing gravel drives, walks, or roads. Stay alert for hidden hazards or traffic. Do not carry passengers.
- After striking a foreign object, stop the engine, remove the wire from the spark plug, thoroughly inspect the machine for any damage, and repair the damage before restarting and operating the machine.
- If the unit should start to vibrate abnormally, stop the engine and check immediately for the cause. Vibration is generally a warning sign of trouble.
- Stop the engine when leaving the operating position, before unclogging the tines, and when making any repairs, adjustments, and inspections.
- Take all possible precautions when leaving the machine unattended. Stop the engine and remove the wire from the spark plug.
- Before cleaning, repairing, or inspecting, shut off the engine and make certain all moving parts have stopped. Disconnect the spark plug wire, and keep the wire away from the plug to prevent accidental starting.
- Do not operate the engine in a confined space where dangerous carbon monoxide gas can collect.
- Never operate the machine without proper guards, plates, or other safety protective devices in place.
- Never operate the Cultivator without good visibility or light.
- Do not use the Cultivator on steep inclines. Use only on level ground surfaces.
- Keep a safe distance from the edges and banks of ditches. Avoid any actions that may cause the Cultivator to tip over.
- Be careful when operating in hard ground. The tines may catch in the ground and propel the tiller forward. If this occurs, let go of the handlebars and do not restrain the machine.
- Keep children away from the equipment, especially while it is operating.
- Keep all spectators at least six feet from the Engine during operation.
- Fire Hazard! Do not fill fuel tank while engine is running. Do not operate if gasoline has been spilled. Clean spilled gasoline before starting engine. Do not operate near pilot light or open flame.
- Do not touch engine during use. Let engine cool down after use.
- Never store fuel or other flammable materials near the engine.
- Only use a suitable means of transport and lifting devices with sufficient weight bearing capacity when transporting the equipment.
- Secure the equipment on transport vehicles to prevent it from rolling, slipping, and tilting.
- Industrial applications must follow OSHA requirements.
- Do not leave the equipment unattended when it is running. Turn off the equipment (and remove safety keys, if available) before leaving the work area.
- The equipment can produce high noise levels. Prolonged exposure to noise levels above 85 dBA is hazardous to hearing. Wear ear protection when operating the equipment or when working nearby while it is operating.
- Wear ANSI-approved safety glasses, hearing protection, heavy-duty work gloves and steel-toed boots during use.
- People with pacemakers should consult their physician(s) before use. Electromagnetic fields in close proximity to a heart pacemaker could cause pacemaker interference or pacemaker failure. Caution is necessary when near the engine's magneto or recoil starter.

27. Use only accessories that are recommended by Harbor Freight Tools for your model. Accessories that may be suitable for one piece of equipment may become hazardous when used on another piece of equipment.
28. Do not operate in explosive atmospheres, such as in the presence of flammable liquids, gases, or dust. Gasoline-powered engines may ignite the dust or fumes.
29. Stay alert, watch what you are doing and use common sense when operating this piece of equipment. Do not use while tired or under the influence of drugs, alcohol or medication.
30. Do not overreach. Keep proper footing and balance at all times. This enables better control of the equipment in unexpected situations.
31. Use this equipment with both hands only. Using equipment with only one hand can easily result in loss of control.
32. Dress properly. Do not wear loose clothing or jewelry. Keep hair, clothing and gloves away from moving parts. Loose clothes, jewelry or long hair can be caught in moving parts.
33. Parts, especially exhaust system components, get very hot during use. Stay clear of hot parts.
34. Do not cover the equipment during operation.
35. Keep the equipment and engine clean at all times.
36. Do not operate the equipment with known leaks in the engine's fuel system.
37. When spills of fuel or oil occur, they must be cleaned up immediately. Dispose of fluids and cleaning materials as per any local, state, or federal codes and regulations. Store oil rags in a bottom-ventilated, covered, metal container.
38. Before use, check for misalignment or binding of moving parts, breakage of parts, and any other condition that may affect the equipment's operation. **If damaged, have the equipment serviced before using.** Many accidents are caused by poorly maintained equipment.
39. Use the correct equipment for the application. Do not modify the equipment and do not use the equipment for a purpose for which it is not intended.

Service Precautions

1. **Before service, maintenance, or cleaning:**
 - a. **Turn the Engine Switch to its “OFF” position.**
 - b. **Allow the Engine to completely cool.**
 - c. **Then, remove the Spark Plug Cap from the Spark Plug.**
 2. Keep machine, attachments, and accessories in safe working condition. Keep all safety guards in place and in proper working order. Safety guards include muffler, air cleaner, mechanical guards, and heat shields, among other guards.
 3. **Do not alter or adjust any part of the equipment or its engine that is sealed by the manufacturer or distributor. Only a qualified service technician may adjust parts that may increase or decrease governed engine speed.**
 4. Check shear bolts, engine mounting bolts, and other bolts at frequent intervals for proper tightness to be sure the equipment is in safe working condition.
 5. Never store the machine with fuel in the fuel tank inside a building where ignition sources are present, such as hot water and space heaters, clothes dryers, and the like. Allow the engine to cool before storing in any enclosure.
 6. If the fuel tank has to be drained, do this outdoors.
 7. Do not store fuel or other flammable materials near the engine.
 8. Wear ANSI-approved safety goggles, heavy-duty work gloves, and dust mask/respirator during service.
 9. Maintain labels and nameplates on the equipment. These carry important information. If unreadable or missing, contact Harbor Freight Tools for a replacement.
 10. Have the equipment serviced by a qualified repair person using only identical replacement parts. This will ensure that the safety of the equipment is maintained. Do not attempt any service or maintenance procedures not explained in this manual or any procedures that you are uncertain about your ability to perform safely or correctly.
 11. Store equipment out of the reach of children.
 12. Follow scheduled engine and equipment maintenance.
- Refueling:**
1. Do not refill the fuel tank while the engine is running or hot.
 2. Do not smoke, or allow sparks, flames, or other sources of ignition around the equipment, especially when refuelling.
 3. **Do not fill fuel tank to the top.** Leave a little room for the fuel to expand as needed, at least 1 inch from top of the neck.
TO PREVENT FUEL LEAKAGE AND FIRE HAZARD, do not fill fuel above the bottom of the threads.
 4. Refuel in a well-ventilated area only.
 5. Wipe up any spilled fuel and allow excess to evaporate before starting engine.
To prevent FIRE, do not start the engine while the smell of fuel hangs in the air.



SAVE THESE INSTRUCTIONS.

PREDATOR™

Set Up



Read the **ENTIRE IMPORTANT SAFETY INFORMATION** section at the beginning of this manual including all text under subheadings therein before set up or use of this product.

WARNING

TO PREVENT SERIOUS INJURY: Operate only with proper spark arrestor installed.



Operation of this equipment may create sparks that can start fires around dry vegetation. A spark arrestor may be required. The operator should contact local fire agencies for laws or regulations relating to fire prevention requirements.

TO PREVENT SERIOUS INJURY FROM ACCIDENTAL STARTING: Turn the Power Switch of the equipment to its “OFF” position, wait for the engine to cool, and unplug the spark plug wire(s) before assembling or making any adjustments to the equipment.

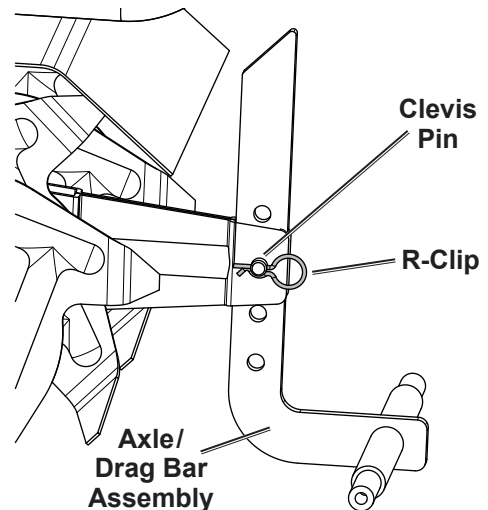
At high altitudes, the engine’s carburetor, governor (if so equipped), and any other parts that control the fuel-air ratio will need to be adjusted by a qualified mechanic to allow efficient high-altitude use and to prevent damage to the engine and any other devices used with this product.

Assembly

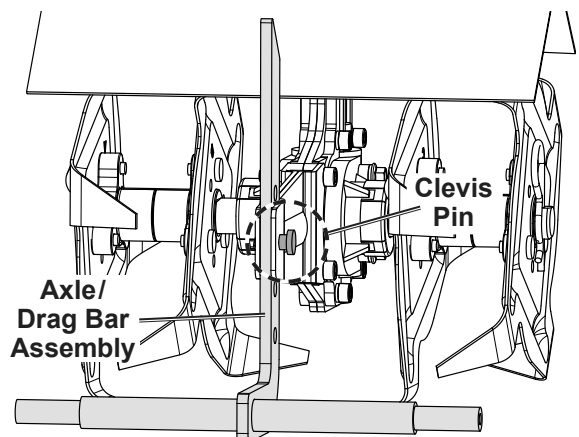
Note: For additional information regarding the parts listed in the following pages, refer to the Assembly Diagram near the end of this manual.

Axle/Drag Bar and Wheel Assembly

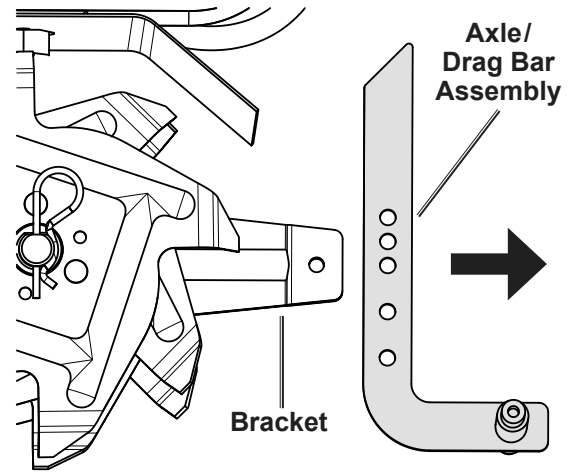
1. Remove the R-Clip (26) from the Clevis Pin (29) holding the Axle/Drag Bar Assembly (25) in place.



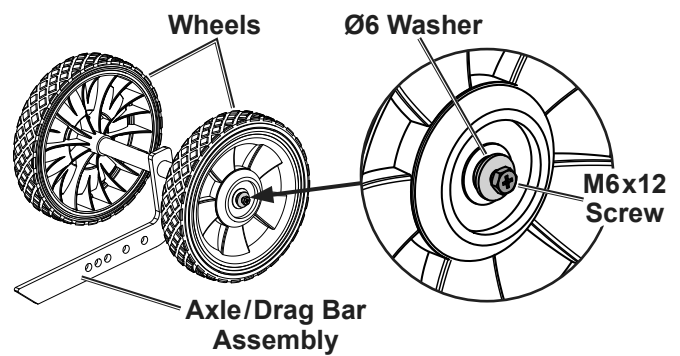
2. Remove the Clevis Pin from the Axle/Drag Bar Assembly.



- Remove the Axle/ Drag Bar Assembly from the bracket on the Cultivator.

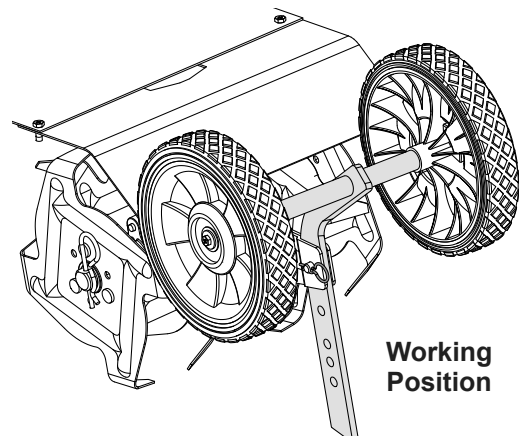
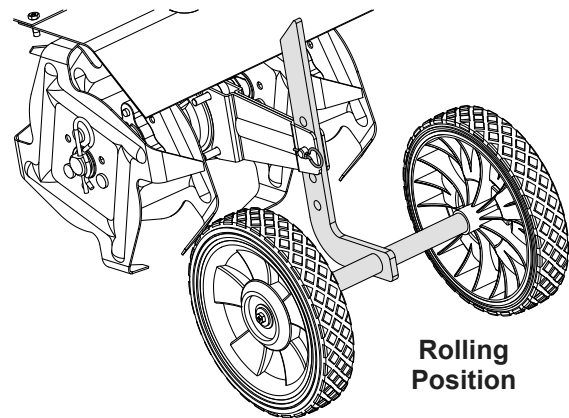


- Attach the two Wheels (24) onto the Axle/ Drag Bar Assembly in orientation shown using one M6x12 Screw (22) and Ø6 Washer (23) per Wheel.



- Attach the completed Axle/ Drag Bar Assembly onto the bracket on the Cultivator using the R-Clip and Clevis Pin removed in steps 1 and 2.

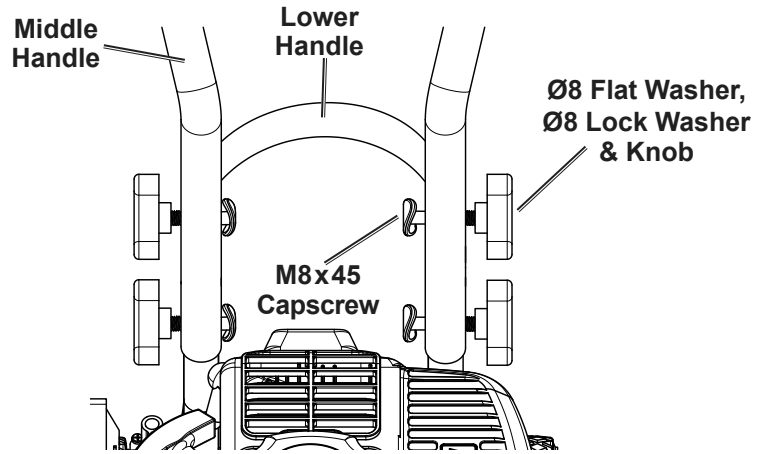
Attach the Axle/ Drag Bar Assembly in the rolling position with the Drag Bar facing up as shown for moving the Cultivator before and after use. For cultivating change the direction to the working position with the Drag Bar facing down.



Handle Assembly

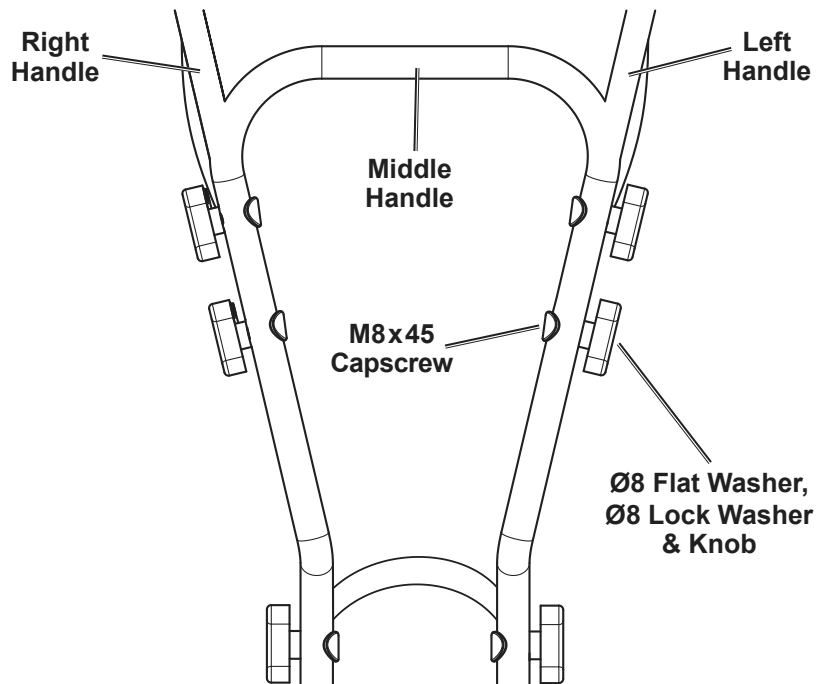
SAFETY

1. Attach the Middle Handle (12) to the Lower Handle (17) using four M8x45 Capscrews (14), Ø8 Flat Washers (58), Ø8 Lock Washers (59), and Knobs (15). Make sure the Knobs are on the outside.



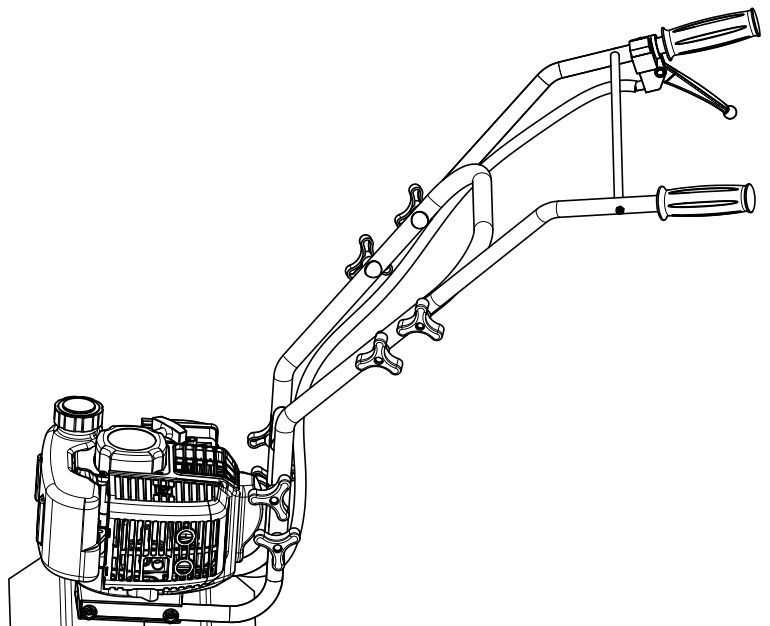
SETUP

2. Attach the Right Handle (11) and Left Handle (13) to the Middle Handle using four M8x45 Capscrews (14), Ø8 Flat Washers (58), Ø8 Lock Washers (59), and Knobs (15). Make sure the Knobs are on the outside.



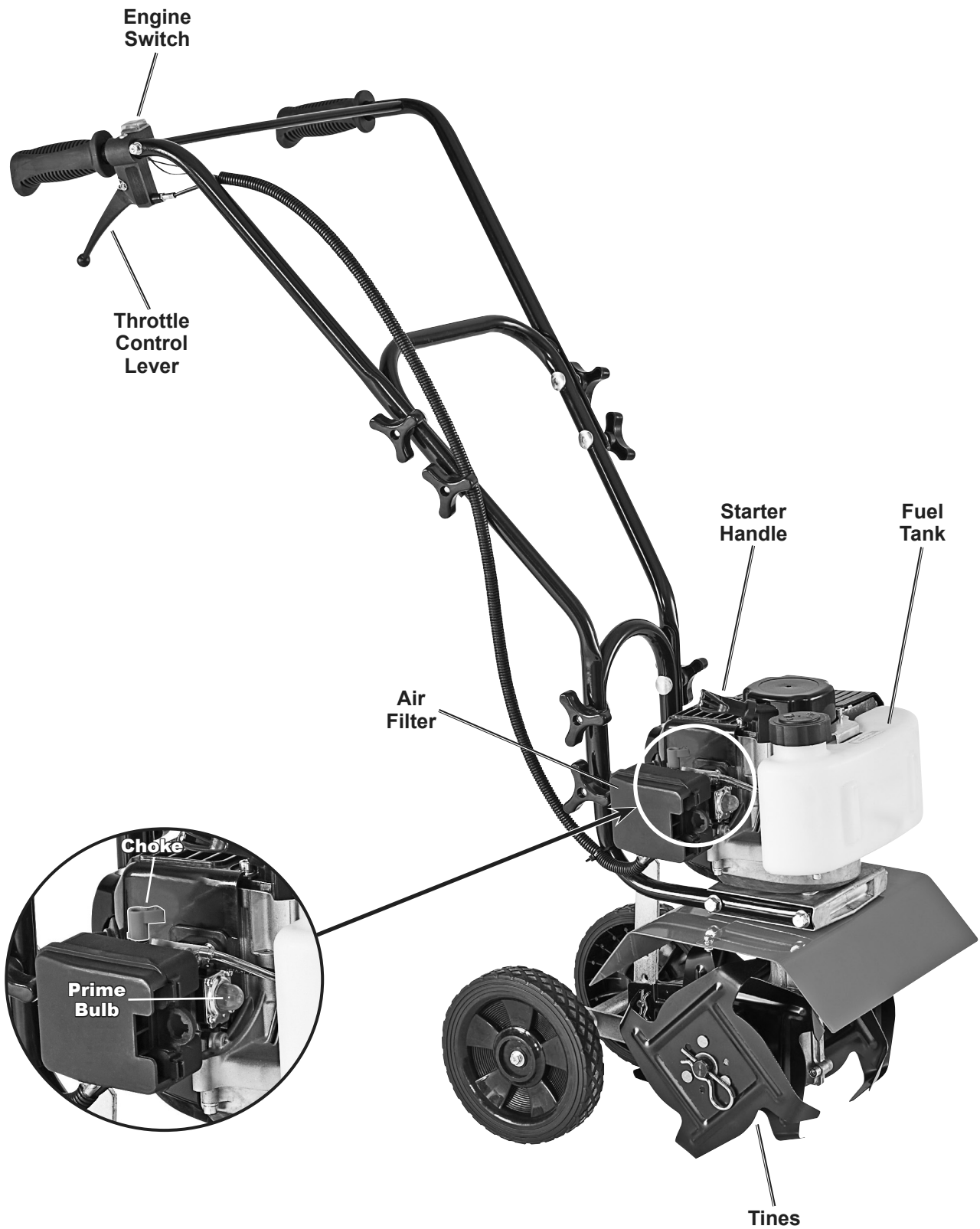
OPERATION

3. Completed Handle Assembly.



MAINTENANCE

Components and Controls



SAFETY

SETUP

OPERATION

MAINTENANCE

Operation

! Read the **ENTIRE IMPORTANT SAFETY INFORMATION** section at the beginning of this manual including all text under subheadings therein before set up or use of this product.

Pre-Start Checks

Inspect engine and equipment looking for damaged, loose, and missing parts before set up and starting. If any problems are found, do not use equipment until fixed properly.

Checking and Filling Fuel



! WARNING! TO PREVENT SERIOUS INJURY FROM FIRE:

Fill the fuel tank in a well-ventilated area away from ignition sources. If the engine is hot from use, shut the engine off and wait for it to cool before adding fuel. Do not smoke.

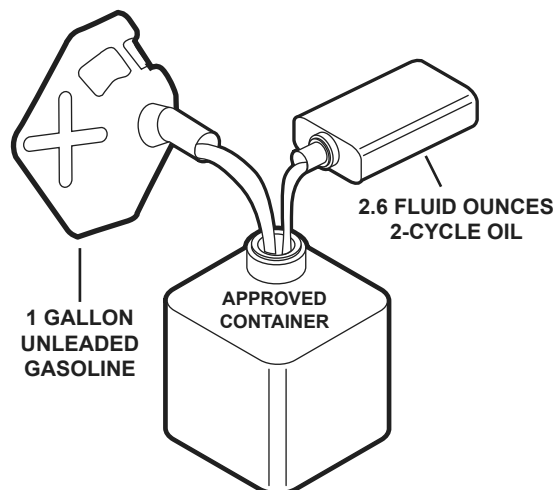
1. Clean the Fuel Cap and the area around it.
2. Unscrew and remove the Fuel Cap.

Note: Do not use gasoline containing more than 10% ethanol (E10). Do not use E85 ethanol. Add fuel stabilizer to the gasoline or the Warranty is VOID.

Note: Do not use gasoline that has been stored in a metal fuel container or a dirty fuel container. It can cause particles to enter the carburetor, affecting engine performance and/or causing damage.

IMPORTANT: Your Warranty is VOID if the Engine's Fuel Tank is not filled with the proper mixture (50:1) of stabilizer-treated unleaded gasoline and 2-cycle oil before each use.

2-Stroke oil must meet either JASO M345 FD or ISO-L-EGD requirements for air-cooled engines, synthetic. Before each use, check the fuel level. Do not run the Engine with an improper unleaded gasoline/2-cycle oil mixture. Running the Engine with an improper mixture WILL permanently damage the Engine.



Fuel-Oil Mixture

3. To obtain the proper gasoline and 2-cycle oil mixture, mix **2.6 fluid ounces of 2-cycle oil with 1 gallon of stabilizer-treated unleaded gasoline** into an approved container. Then gently agitate the container to thoroughly mix the gasoline/2-cycle oil.
4. If needed, fill the Fuel Tank to about 1 inch under the fill neck of the Fuel Tank with the pre-mixed unleaded gasoline/2-cycle oil mixture.
5. Then replace the Fuel Cap.
6. Wipe up any spilled fuel and allow excess to evaporate before starting engine. To prevent FIRE, do not start the engine while the smell of fuel hangs in the air.

Starting the Engine

Before Starting the Engine



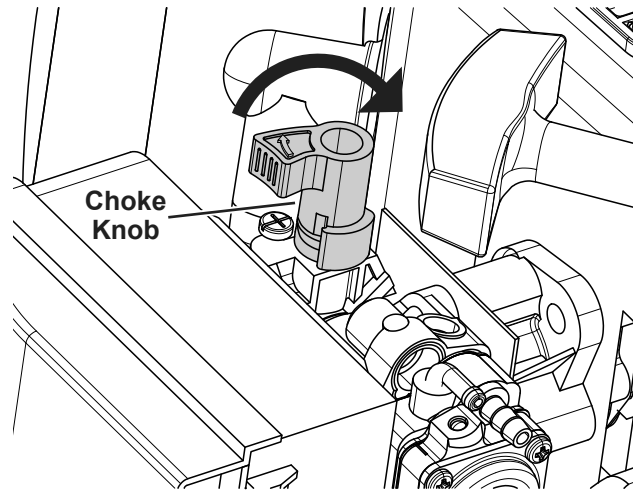
- a. Inspect the equipment and engine.
- b. Fill the engine fuel tank with the proper amount and type of stabilizer-treated unleaded gasoline and 2-cycle oil mixture.

Manual Start

A “cold start” is when the engine is no longer hot to the touch, typically at least 30 minutes after it has last been run.

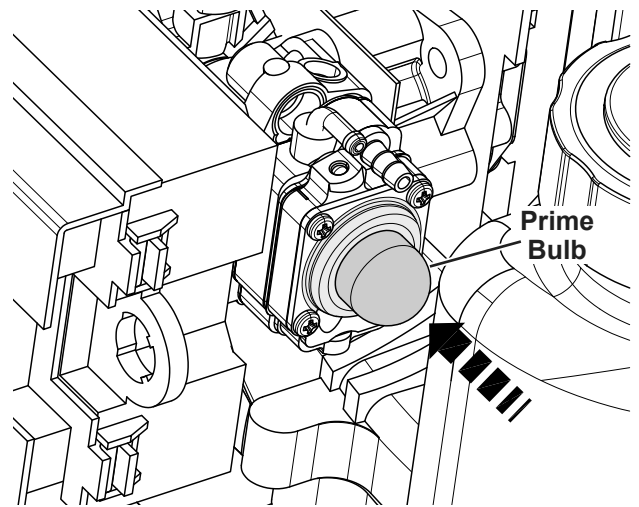
1. To start a cold Engine, turn the Choke Knob clockwise to the START (closed) position.

1



2. Press the Prime Bulb 7–10 times until fuel can be seen in the fuel line.

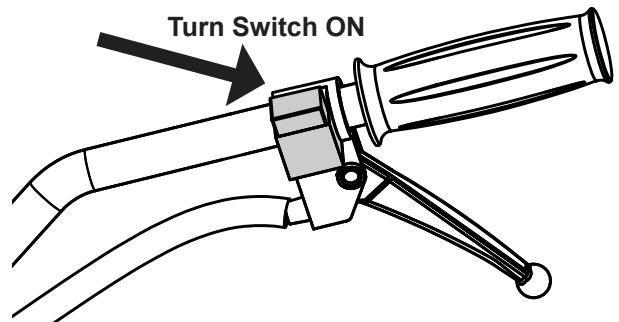
2



3. Turn the Engine Switch ON.

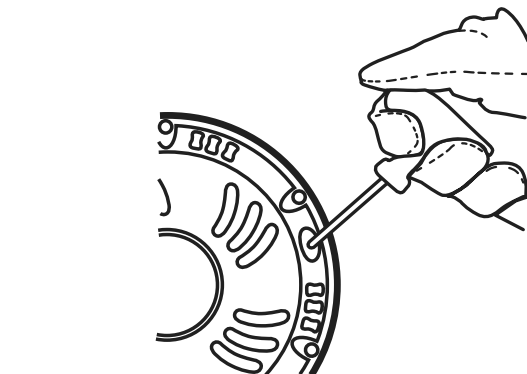
Note: Do not pull on the Throttle Control Lever when starting the Engine.

3



4. Grip the Starter Handle of the Engine loosely and pull it gently until resistance is felt. Allow Cable to retract fully and then pull it quickly. Repeat until the Engine starts.

4



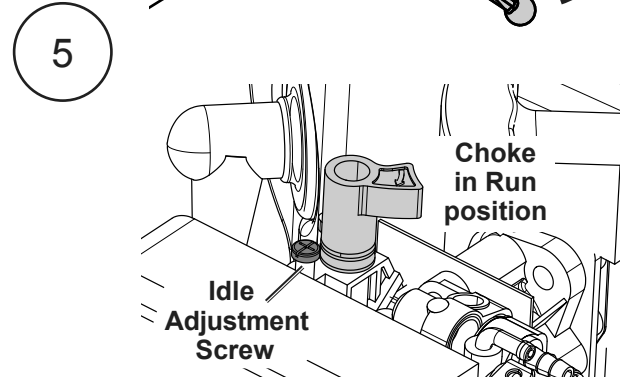
Note: Do not let the Starter Handle snap back against the Engine. Hold it as it recoils so it doesn't hit the Engine.

5. Allow the Engine to run for 10–15 seconds with the Choke in the START position. Then pull up on the Throttle Control Lever to automatically move the Choke lever to its RUN (open) position. Release the Throttle Lever.

IMPORTANT: Allow the Engine to warm up at idle for 2–3 minutes after each start-up so that the Engine can stabilize.

WARNING! TO PREVENT SERIOUS INJURY:

If the Tines rotate with the Engine idling and the Throttle Control Lever fully released, turn the Idle Adjustment Screw counterclockwise to decrease idle speed until the Tines stop rotating.

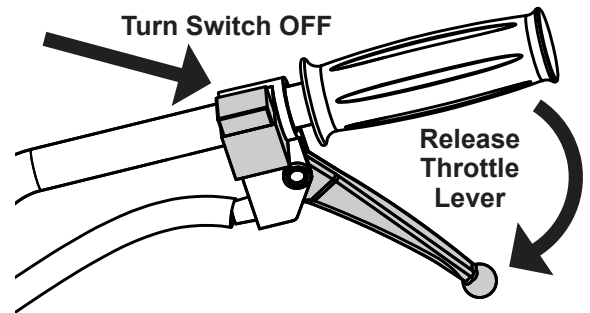


To Restart a Warm Engine

Leave the Choke in Run position. If Choke is not in Run position pull and release the Throttle Control Lever to return Choke to its RUN position and follow Steps 3 and 4 in the starting instructions above. If Engine fails to start use the cold engine starting procedure.

Stopping the Engine

1. To stop the engine in an emergency, release the Throttle Control Lever and turn the Engine Switch OFF.



2. Under normal conditions, use the following procedure:
 - a. Release the Throttle Control Lever.
 - b. Let Engine idle for 1–2 minutes.
 - c. Turn the Engine Switch OFF.
 - d. Clean external parts with clean cloth, remove debris from Tine Blades and Shaft, then cover the equipment and store in a dry, level, well-ventilated area out of reach of children. Under normal operating conditions subsequent maintenance follows the schedule explained in the MAINTENANCE section.

NOTICE

See Long-Term Storage on page 19 for complete storage instructions.

Cultivator Operation

⚠️ WARNING

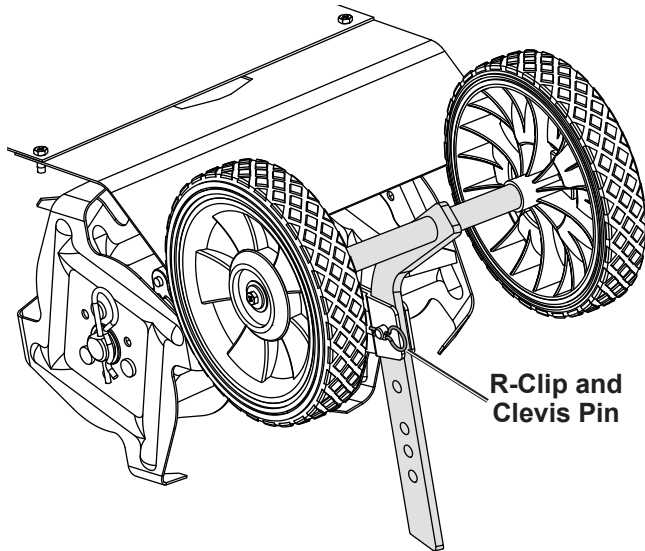
TO PREVENT SERIOUS INJURY: Keep hands, fingers, feet, and loose clothing away from rotating Tines.

BEWARE of possible buried obstacles such as cable, conduit, irrigation lines, and landscape fabric.

DO NOT operate above or near any electrical cables, gas pipes, or any other utility lines. Contact your local utility company before using the Cultivator.

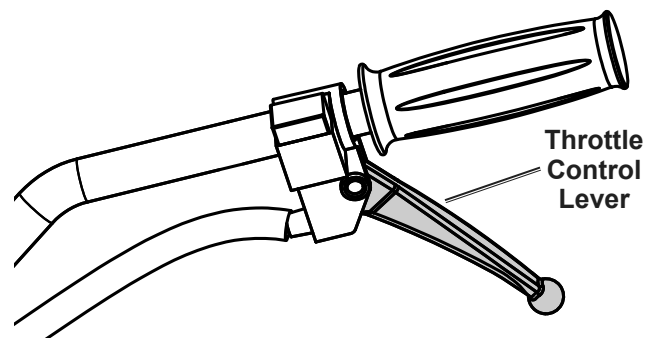
1. Before starting the Engine, place the Axle/Drag Bar Assembly in the cultivating position and set the desired cultivating depth (to a maximum 6" deep) by adjusting the Axle/Drag Bar Assembly:
Remove the R-Clip and Clevis Pin holding the Assembly in place. Lower the Assembly to increase cultivating depth or raise it to decrease depth. Replace the Clevis Pin and R-Clip.
3. Start the Engine following instructions in *Manual Start* on page 13.
4. Grip the Handles firmly with both hands.
5. With the Engine running, pull up on the Throttle Control Lever on the Handlebar to rotate the Tines and move forward. Release the Throttle Control Lever to stop Tine rotation and forward movement.

Note: Optimum tilling depth (generally 4"–6") will vary with soil conditions. If Cultivator shakes or is difficult to control, the Axle/Drag Bar Assembly is not correctly set for the conditions. Adjustment through trial and error is required to achieve the correct setting.



**Axle/Drag Bar Assembly
in Cultivating Position**

2. **WARNING! TO PREVENT SERIOUS INJURY:** Before first use, practice operating the Cultivator controls with Tines raised off of the ground. Know how to keep control at all times, how to stop the Tines from turning, and how to stop the Engine. For actual field use, operate at a slow pace until familiar with Cultivator handling.



6. The following soil conditions can affect tilling results:
 - a. On soil that is too hard and/or dried out for the Tines to penetrate, the Cultivator will shake excessively and jump across the soil surface. Moisten dry, hardened soil prior to tilling and use a shallow depth setting and slow Engine speed.
 - b. Exceedingly wet soil will form clumps during tilling and clog the Tines. Allow wet soil to partially dry before tilling and use a slow Engine speed to improve results.

NOTICE: Should the Tines jam or the Cultivator strike a foreign object during use, immediately release the Throttle Control Lever and turn off the Engine. Wait until the machine completely stops. Disconnect the Spark Plug cap, remove foreign objects and inspect the Cultivator. If any damage is found have the problem corrected before further use.

⚠️WARNING

TO PREVENT SERIOUS INJURY FROM ACCIDENTAL STARTING:

Turn the Power Switch of the equipment to its “OFF” position, wait for the engine to cool, and disconnect the spark plug cap before performing any inspection, maintenance, or cleaning procedures.

TO PREVENT SERIOUS INJURY FROM EQUIPMENT FAILURE:

Do not use damaged equipment. If abnormal noise, vibration, or excess smoking occurs, have the problem corrected before further use.

Follow all service instructions in this manual. The engine may fail critically if not serviced properly.



Many maintenance procedures, including any not detailed in this manual, will need to be performed by a qualified technician for safety. If you have any doubts about your ability to safely service the equipment or engine, have a qualified technician service the equipment instead.

Cleaning, Maintenance, and Lubrication Schedule

Note: This maintenance schedule is intended solely as a general guide. If performance decreases or if equipment operates unusually, check systems immediately. The maintenance needs of each piece of equipment will differ depending on factors such as duty cycle, temperature, air quality, fuel quality, and other factors.

Note: The following procedures are in addition to the regular checks and maintenance explained as part of the regular operation of the engine and equipment.

Procedure	Before Each Use	After Each Use	Monthly or every 20 hr. of use	Every 3 mo. or 50 hr. of use	Every 6 mo. or 100 hr. of use	Yearly or every 300 hr. of use	Every 2 Years
Brush off outside of engine	✓		✓	✓	✓	✓	✓
Check engine fuel/oil mixture level	✓		✓	✓	✓	✓	✓
Check for loose hardware	✓		✓	✓	✓	✓	
Check/adjust idle speed	✓						
Clean debris from Tine Blades and Shaft		✓	✓	✓	✓	✓	✓
Clean air filter				✓*	✓	✓	✓
Check sediment cup					✓	✓	✓
Check and clean spark plug					✓	✓	✓
1. Clean fuel tank, strainer and carburetor 2. Clean carbon build-up from combustion chamber						✓**	✓**
Replace fuel line if necessary							✓**

* Service more frequently when used in dusty areas.

** These items should be serviced by a qualified technician.

Checking and Filling Fuel



⚠ WARNING! TO PREVENT SERIOUS INJURY FROM FIRE:

Fill the fuel tank in a well-ventilated area away from ignition sources. If the engine is hot from use, shut the engine off and wait for it to cool before adding fuel. Do not smoke.

1. Clean the Fuel Cap and the area around it.
2. Unscrew and remove the Fuel Cap.

Note: Do not use gasoline containing more than 10% ethanol (E10). Do not use E85 ethanol. Add fuel stabilizer to the gasoline or the Warranty is VOID.

Note: Do not use gasoline that has been stored in a metal fuel container or a dirty fuel container. It can cause particles to enter the carburetor, affecting engine performance and/or causing damage.

IMPORTANT: Your Warranty is VOID if the Engine's Fuel Tank is not filled with the proper mixture (50:1) of stabilizer-treated unleaded gasoline and 2-cycle oil before each use.

2-Stroke oil must meet either JASO M345 FD or ISO-L-EGD requirements for air-cooled engines, synthetic. Before each use, check the fuel level. Do not run the Engine with an improper unleaded gasoline/2-cycle oil mixture. Running the Engine with an improper mixture WILL permanently damage the Engine.

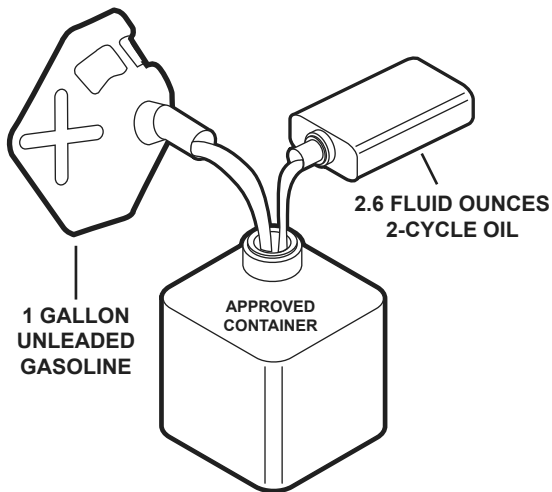
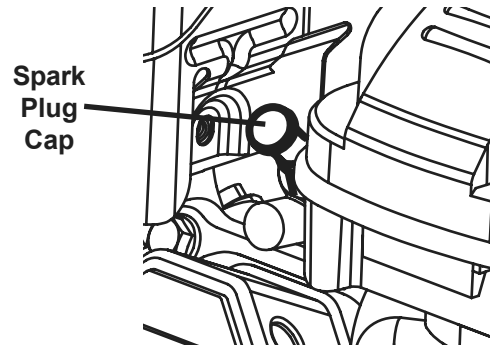


Figure A: Fuel-Oil Mixture

3. To obtain the proper gasoline and 2-cycle oil mixture, mix **2.6 fluid ounces of 2-cycle oil with 1 gallon of stabilizer-treated unleaded gasoline** into an approved container. Then gently agitate the container to thoroughly mix the gasoline/2-cycle oil.
4. If needed, fill the Fuel Tank to about 1 inch under the fill neck of the Fuel Tank with the pre-mixed unleaded gasoline/2-cycle oil mixture.
5. Then replace the Fuel Cap.
6. Wipe up any spilled fuel and allow excess to evaporate before starting engine. To prevent FIRE, do not start the engine while the smell of fuel hangs in the air.

Spark Plug Maintenance



1. Disconnect spark plug cap from end of plug. Clean out debris from around spark plug.
2. Using a spark plug wrench, remove the spark plug.

NOTICE: Do not remove spark plug when Engine is hot or possible damage to threads may occur.

3. Inspect the spark plug:
If the electrode is oily, clean it using a clean, dry rag. If the electrode has deposits on it, polish it using emery paper. If the white insulator is cracked or chipped, the spark plug needs to be replaced.

Recommended Spark Plug

TORCH®

L8RTC

NOTICE: Using an incorrect spark plug may damage the engine.

4. When installing a new spark plug, adjust the plug's gap to the specification on the Specifications chart. Do not pry against the electrode—the spark plug can be damaged.
5. Install the new spark plug or the cleaned spark plug into the engine.

• Gasket-style:

Finger-tighten until the gasket contacts the cylinder head, then tighten about 1/2–2/3 turn more.

• Non-gasket-style:

Finger-tighten until the plug contacts the cylinder head, then tighten about 1/16 turn more.

NOTICE: Tighten the spark plug properly.

If loose, the spark plug will cause the engine to overheat.

If overtightened, the threads in the engine block will be damaged.

6. Apply dielectric spark plug boot protector (not included) to the end of the spark plug and reattach the wire securely.

Air Filter Maintenance

1. Remove the Air Cleaner Cover and the air filter(s) and check for dirt. Clean as described below.
2. **Cleaning:**
 - For paper filters:
To prevent injury from dust and debris, wear ANSI-approved safety goggles, NIOSH-approved dust mask/respirator, and heavy-duty work gloves. In a well-ventilated area away from bystanders, use pressurized air to blow dust out of the filter.

- For foam filters:
Wash the filter in warm water and mild detergent several times. Rinse. Squeeze out excess water and allow it to dry completely. Soak the filter in lightweight oil briefly, then squeeze out the excess oil.

3. Install the cleaned filter(s). Secure the Air Cleaner Cover before use.

Long-Term Storage

When the equipment is to remain idle for longer than 20 days, prepare the Engine for storage as follows:

1. **CLEANING:**

Wait for Engine to cool, then clean Engine with dry cloth. **NOTICE: Do not clean using water.** The water will gradually enter the Engine and cause corrosion damage. Apply a thin coat of corrosion preventive oil to all metal parts.

2. **FUEL:**



⚠ WARNING! TO PREVENT SERIOUS INJURY FROM FIRE:

Drain the Fuel Tank in a well-ventilated area away from ignition sources. If the engine is hot from use, shut the engine off and wait for it to cool before adding fuel. Do not smoke.

- a. Remove the Fuel Tank Cap and drain any remaining fuel into an approved storage container.
- b. Press the Prime Bulb 8 times.
- c. Drain any residual fuel into the storage container.
- d. Start the Engine and run at idle until the Engine stalls from lack of fuel.
- e. Replace Fuel Tank Cap and tighten securely.

3. **LUBRICATION:**

- a. Clean out area around spark plug. Remove spark plug and pour 1/2 tablespoon of 2-cycle oil into cylinder through spark plug hole.
- b. Replace spark plug, but leave spark plug cap disconnected.
- c. Pull Starter Handle to distribute oil in cylinder. Stop after one or two revolutions when you feel the piston start the compression stroke (when you start to feel resistance).

4. **STORAGE AREA:**

Cover and store in an upright position in a dry, level, well-ventilated area out of reach of children. Storage area should also be away from ignition sources, such as water heaters, clothes dryers, and furnaces.

5. **AFTER STORAGE:**

Before starting the Engine after storage, follow the procedures in *Pre-Start Checks* on page 12. If using pre-mixed fuel that has been stored, keep in mind that during storage some of the gasoline in the fuel evaporates while the 2-stroke oil does not, altering the gasoline-to-oil mix ratio. Running the Engine with an improper mixture WILL permanently damage the Engine. Use freshly mixed fuel when starting the Engine after storage.

Troubleshooting

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Problem	Possible Causes	Probable Solutions
Engine will not start	FUEL RELATED: <ol style="list-style-type: none"> No fuel in tank. Choke not in START (closed) position, cold engine. Gasoline with more than 10% ethanol used. (E15, E20, E85, etc.) Low quality or deteriorated, old gasoline/oil mixture. Carburetor not primed. Dirty fuel passageways. Carburetor is flooded. Clogged Fuel Filter. Idle speed set too low. 	FUEL RELATED: <ol style="list-style-type: none"> Fill fuel tank with fresh 87+ octane stabilizer-treated unleaded gasoline/2-cycle oil mixture only. Do not use gasoline with more than 10% ethanol (E15, E20, E85, etc.). Move Choke to START (closed) position. Clean out ethanol rich gasoline from fuel system. Replace components damaged by ethanol. Use only fresh 87+ octane stabilizer-treated unleaded gasoline/2-cycle oil mixture only. Do not use gasoline with more than 10% ethanol (E15, E20, E85, etc.). Use fresh 87+ octane stabilizer-treated unleaded gasoline/2-cycle oil mixture only. Do not use gasoline with more than 10% ethanol (E15, E20, E85, etc.). Press the Prime Bulb several times to prime. Clean out passageways using fuel additive. Heavy deposits may require further cleaning. Turn Choke Knob to RUN (open) position. Pull Starter Handle 10-20 times to clear out Carburetor, then attempt to start with normal process. Replace Fuel Filter. Turn the Idle Adjustment Screw clockwise to increase idle speed. Do not turn too far to position where Tines begin to rotate with Engine idling.
	IGNITION (SPARK) RELATED: <ol style="list-style-type: none"> Spark plug cap not connected securely. Spark plug electrode wet or dirty. Incorrect spark plug gap. Spark plug cap broken. Incorrect spark timing or faulty ignition system. 	IGNITION (SPARK) RELATED: <ol style="list-style-type: none"> Connect spark plug cap properly. Clean spark plug. Correct spark plug gap. Replace spark plug cap. Have qualified technician diagnose/repair ignition system.
	COMPRESSION RELATED: <ol style="list-style-type: none"> Cylinder not lubricated. Problem after long storage periods. Loose or broken spark plug. (Hissing noise will occur when trying to start.) Loose cylinder head or damaged head gasket. (Hissing noise will occur when trying to start.) 	COMPRESSION RELATED: <ol style="list-style-type: none"> Pour tablespoon of 2-cycle oil into spark plug hole. Crank engine a few times and try to start again. Tighten spark plug. If that does not work, replace spark plug. If problem persists, may have head gasket problem—see #3. Tighten head. If that does not remedy problem, replace head gasket.



Follow all safety precautions whenever diagnosing or servicing the equipment or engine.

Problem	Possible Causes	Probable Solutions
Engine misfires	<ol style="list-style-type: none"> 1. Spark plug cap loose. 2. Incorrect spark plug gap or damaged spark plug. 3. Defective spark plug cap. 4. Old or low quality gasoline/oil mixture. 5. Incorrect compression. 	<ol style="list-style-type: none"> 1. Check cap and wire connections. 2. Re-gap or replace spark plug. 3. Replace spark plug cap. 4. Use fresh 87+ octane stabilizer-treated unleaded gasoline/2-cycle oil mixture only. Do not use gasoline with more than 10% ethanol (E15, E20, E85, etc.). 5. Diagnose and repair compression. (Use Engine will not start: COMPRESSION RELATED section.)
Engine stops suddenly	<ol style="list-style-type: none"> 1. Fuel tank empty or full of impure or low quality gasoline/oil mixture. 2. Defective breather valve creating vacuum, preventing proper fuel flow. 3. Faulty magneto. 4. Disconnected or improperly connected spark plug cap. 	<ol style="list-style-type: none"> 1. Fill tank with fresh 87+ octane stabilizer-treated unleaded gasoline/2-cycle oil mixture. Do not use gasoline with more than 10% ethanol (E15, E20, E85, etc.). 2. Test/replace breather valve. 3. Have qualified technician service magneto. 4. Secure spark plug cap.
Engine stops when under heavy load	<ol style="list-style-type: none"> 1. Dirty air filter. 2. Engine running cold. 	<ol style="list-style-type: none"> 1. Clean element. 2. Allow engine to warm up prior to operating equipment.
Engine knocks	<ol style="list-style-type: none"> 1. Old or low quality gasoline/oil mixture. 2. Engine overloaded. 3. Incorrect spark timing, deposit buildup, worn engine, or other mechanical problems. 	<ol style="list-style-type: none"> 1. Refuel with fresh 87+ octane stabilizer-treated unleaded gasoline/2-cycle oil mixture. Do not use gasoline with more than 10% ethanol (E15, E20, E85, etc.). 2. Do not exceed equipment's load rating. 3. Have qualified technician diagnose and service engine.
Engine labors or stalls when cultivating	<ol style="list-style-type: none"> 1. Engine speed too low. 2. Cultivating at too great a depth. 	<ol style="list-style-type: none"> 1. Adjust throttle to increase Engine speed. 2. Adjust Axle/Drag Bar Assembly in working position as needed for shallower cultivating.
Excessive shaking/Cultivator difficult to control	<ol style="list-style-type: none"> 1. Ground too hard and/or dried out. 2. Axle/Drag Bar Assembly not correctly set for soil conditions. 	<ol style="list-style-type: none"> 1. Wet the ground prior to cultivating. 2. Adjust Axle/Drag Bar Assembly in working position as needed to achieve correct setting.
After sudden impact, Engine runs but Tines do not rotate	Shaft key or other shear pin broken by impact to disconnect Engine and limit damage.	Have qualified technician check and replace broken shaft key or other shear pins.



Follow all safety precautions whenever diagnosing or servicing the equipment or engine.

PLEASE READ THE FOLLOWING CAREFULLY

THE MANUFACTURER AND/OR DISTRIBUTOR HAS PROVIDED THE PARTS LIST AND ASSEMBLY DIAGRAM IN THIS MANUAL AS A REFERENCE TOOL ONLY. NEITHER THE MANUFACTURER OR DISTRIBUTOR MAKES ANY REPRESENTATION OR WARRANTY OF ANY KIND TO THE BUYER THAT HE OR SHE IS QUALIFIED TO MAKE ANY REPAIRS TO THE PRODUCT, OR THAT HE OR SHE IS QUALIFIED TO REPLACE ANY PARTS OF THE PRODUCT. IN FACT, THE MANUFACTURER AND/OR DISTRIBUTOR EXPRESSLY STATES THAT ALL REPAIRS AND PARTS REPLACEMENTS SHOULD BE UNDERTAKEN BY CERTIFIED AND LICENSED TECHNICIANS, AND NOT BY THE BUYER. THE BUYER ASSUMES ALL RISK AND LIABILITY ARISING OUT OF HIS OR HER REPAIRS TO THE ORIGINAL PRODUCT OR REPLACEMENT PARTS THERETO, OR ARISING OUT OF HIS OR HER INSTALLATION OF REPLACEMENT PARTS THERETO.

Main Parts List

Part	Description	Qty.
1	Handle Grip	2
2	Throttle Lever	1
3	Circlip Ø3.5	1
4	Torsion Spring	1
5	Throttle Bracket	1
6	Screw St4.8x19	1
7	Switch Assembly	1
8	Pin	1
9	Throttle Cable Assembly	1
10	Connector Wire	1
11	Right Handle	1
12	Middle Handle	1
13	Left Handle	1
14	Capscrew M8x45	8
15	Handle Knob M8	8
16	Tie Strap	5
17	Lower Handle	1
18	Bolt M8x150	2
19	Switch Cover	1
20	Flange Lock Nut M8	2
21	Screw M6x16	2
22	Screw M6x12	2
23	Washer Ø6	2
24	Wheel	2
25	Axle/Drag Bar Assembly	1
26	R-Clip Ø3	1
27	Bracket Assembly	1
28	Bolt M6x35	2
29	Clevis Pin 8x18	1
30	Flange Lock Nut M6	2
31	Nut M8	1
32	Clutch Drum	1
33	Roller Bearing 629-2rs	1
34	Worm Shaft Flange Bushing	1
35	Needle Roller Thrust Bearing	1

Part	Description	Qty.
36	Bearing Thrust Reducer	1
37	Worm Gear Shaft	1
38	Washer	1
39	Needle Roller Bearing	1
40	Seal Washer	2
41	Bolt M6x10	2
42	Tine Assembly D	1
43	Tine Assembly C	1
44	Bolt M6x20	6
45	Left Gear Housing	1
46	Right Gear Housing	1
47	Tine Assembly B	1
48	Tine Assembly A	1
49	R-Clip	2
50	Dust Cap	2
51	Fiber Washer	2
52	Seal FB 19x32x6.5	2
53	Tine Shaft Flange Bushing	2
54	Washer	2
55	Drive Gear	1
56	Tine Shaft	1
57	Rear Tine Shield	1
58	Washer Ø8	8
59	Lock Washer Ø8	8
60	Bolt M5x16	2
61	Lock Nut M5	2
62	Front Tine Shield	1
63	Lock Washer Ø6	4
64	Bolt M6x40	4
65	Throttle Cable Housing	1
66	Combined Tine Shaft/Gear Assembly	1
67	Engine	1
68	Transmission Assembly	1
69	Cross Bar	1

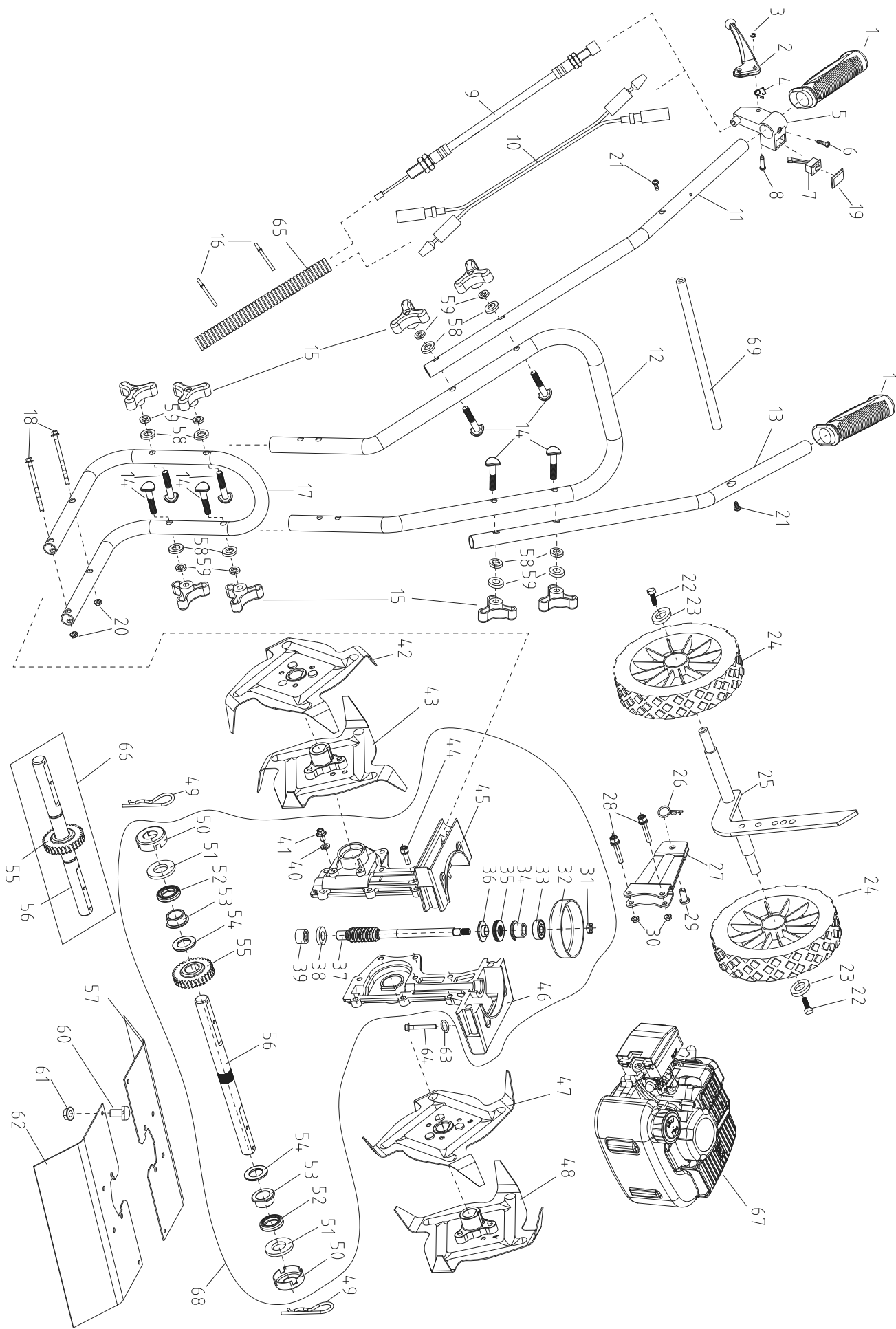
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Main Assembly Diagram



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Engine Parts List

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Part	Description	Qty.
1A	Starter Assembly	1
2A	Screw M5x20	7
3A	Starter Gasket	1
4A	Start Claw	2
5A	Start Spring	2
6A	Start Reel	1
7A	Stop Ring	2
8A	Start Reel Assembly	1
9A	Oil Seal	1
10A	Rear Crankcase	1
11A	Crankcase Gasket	1
12A	Bearing 6202/P6	2
13A	Crankshaft/Connecting Rod Assembly	1
14A	Key 3x5x13	1
15A	Pin 4x10	4
16A	Front Crankcase	1
17A	Screw M4x12	1
18A	Screw M5x30	4
19A	Engine Fan	1
20A	Washer Ø8	1
21A	Lock Washer Ø8	1
22A	Nut M8	1
23A	Ignition Coil	1
24A	Cord Component	1
25A	Flat Washer	2
26A	Expander	1
27A	Wave Spring Washer	2
28A	Screw Pin	2
29A	Fan Cover	1
30A	Oil Seal	1
31A	Screw M5x25	6
32A	Connecting Rod Bearing	1
33A	Piston Pin Circlip	2
34A	Piston	1
35A	Piston Pin	1
36A	Piston Ring	2

Part	Description	Qty.
37A	Cylinder Gasket	1
38A	Cylinder	1
39A	Screw M5x20	4
40A	Engine Housing	1
41A	Spark Plug	1
42A	Spark Plug Spring	1
A43	Gasket	1
A44	Spark Plug Cap	1
45A	Plug	1
46A	Top Cover	1
47A	Insulation Gasket	1
48A	Muffler Gasket	1
49A	Muffler Assembly	1
50A	Muffler Cover	1
51A	Screw M5x12	2
52A	Screw M6x60-12.9	2
53A	Air Intake Pipe Gasket	1
54A	Air Intake Pipe	1
55A	Carburetor Gasket	1
56A	Carburetor Assembly	1
57A	Air Cleaner Housing	1
58A	Screw M5x50	2
59A	Filter Plate	1
60A	Air Filter	1
61A	Air Cleaner Cover	1
62A	Fuel Tank Stand	1
63A	Rubber Cover	1
64A	Fuel Filter	1
65A	Fuel Inlet Pipe	1
66A	Seal Plug	1
67A	Fuel Return Pipe	1
68A	Screw M5x16	2
69A	Fuel Tank	1
70A	Fuel Tank Cap Assembly	1
71A	Rubber Washer	2
72A	Carburetor Cover	1

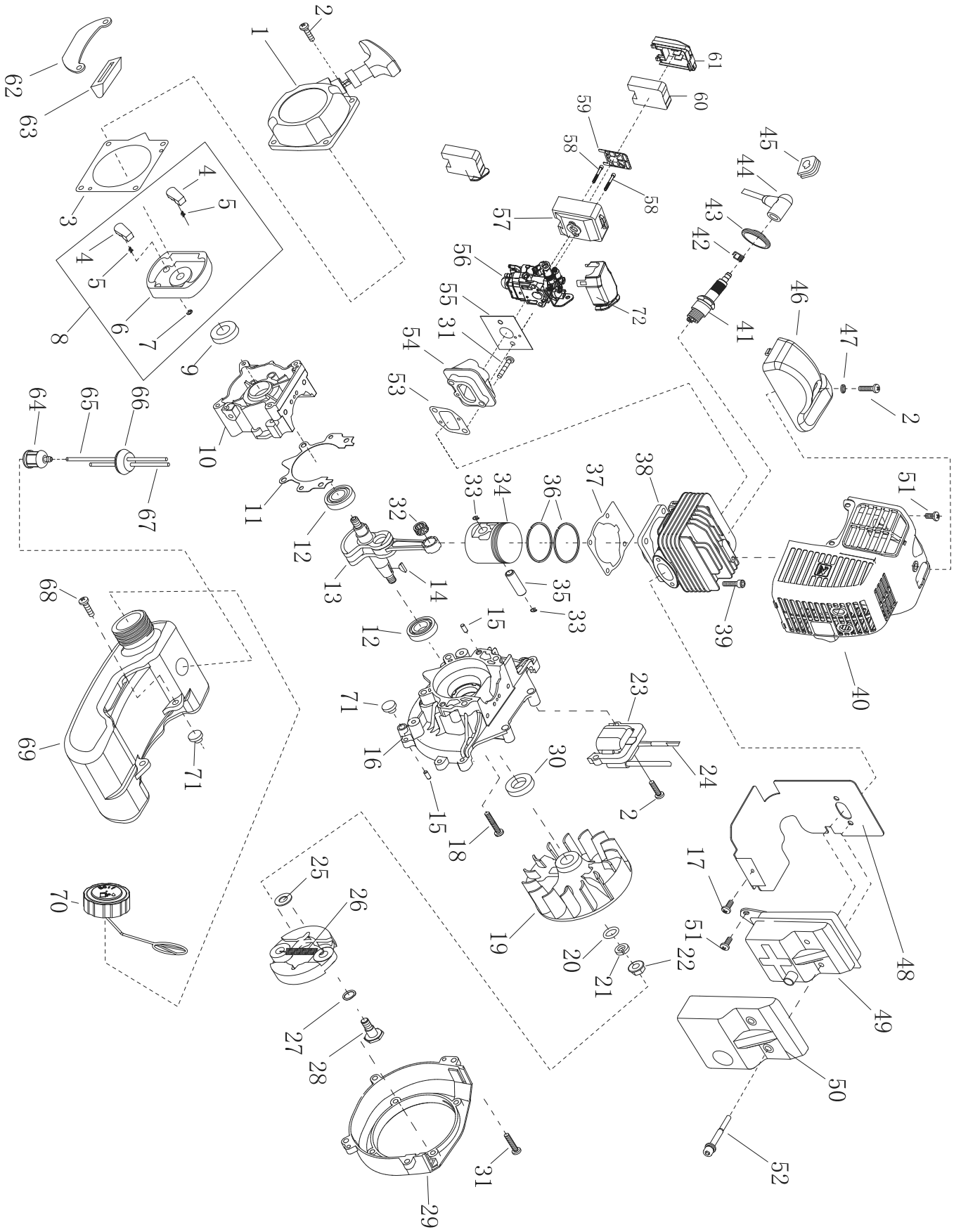
When ordering replacement parts from this list, the "A" suffix must be included in order to get the correct part.

Record Product's Serial Number Here: _____

Note: If product has no serial number, record month and year of purchase instead.

Note: Some parts are listed and shown for illustration purposes only, and are not available individually as replacement parts. Reference UPC 193175554413.

Engine Assembly Diagram



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PICTURES

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Limited 90 Day Warranty (Retail)

SAFETY

Harbor Freight Tools Co. makes every effort to assure that its products meet high quality and durability standards, and warrants to the original purchaser that this product is free from defects in materials and workmanship for the period of 90 days from the date of purchase. This warranty does not apply to damage due directly or indirectly, to misuse, abuse, negligence or accidents, repairs or alterations outside our facilities, criminal activity, improper installation, normal wear and tear, or to lack of maintenance. We shall in no event be liable for death, injuries to persons or property, or for incidental, contingent, special or consequential damages arising from the use of our product. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation of exclusion may not apply to you. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS, EXCEPT FOR THE EMISSIONS CONTROL SYSTEM WARRANTY BELOW.

SETUP

To take advantage of this warranty, the product or part must be returned to us with transportation charges prepaid. Proof of purchase date and an explanation of the complaint must accompany the merchandise. If our inspection verifies the defect, we will either repair or replace the product at our election or we may elect to refund the purchase price if we cannot readily and quickly provide you with a replacement. We will return repaired products at our expense, but if we determine there is no defect, or that the defect resulted from causes not within the scope of our warranty, then you must bear the cost of returning the product.

This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

OPERATION

MAINTENANCE

Emissions Control System Warranty

In accordance with U.S. Environmental Protection Agency (EPA) regulations, Harbor Freight Tools (HFT) is pleased to explain the emissions control system warranty on your Model Year 2024 engine/equipment in addition to the Retail Warranty above. HFT warrants that the emissions control system on your engine is designed, built, and equipped so that it conforms to the United States Environmental Protection Agency's (EPA) emissions requirements in effect at the time of manufacture. HFT also warrants that the emissions control system on your engine will be free from defects in material and workmanship for two (2) years, provided there has been no improper maintenance, misuse, or abuse of your engine.

Your emissions control system may include parts such as the carburetor or fuel-injection system, and the ignition system. Also included may be hoses, belts, connectors and other emissions-related assemblies.

CALIFORNIA ONLY: This engine's emission standards are governed solely by U.S. Environmental Protection Agency regulations because it is intended for use primarily in a farm or construction equipment or activity in California.

WHAT WE WILL DO

Where a warrantable condition exists, HFT will repair or replace, at our option, any emissions-related part on your engine if it becomes defective, malfunctions, or otherwise fails to conform with this warranty under normal use and service during the two (2) year term of this warranty at no cost to you, including diagnosis, parts and labor. This warranty applies to the original purchaser and any subsequent owner within the two year warranty period.

WHAT IS COVERED?

The following parts are examples of components of the emissions control system and are covered by this two (2) year warranty. For a full list of emissions control components covered by this warranty, please see 40 CFR §1068, Appendix I.

1. Fuel Metering System
 - a. Carburetor and its internal parts.
 - b. Fuel pump (if so equipped).
 - c. Cold start enrichment system.
2. Air Induction System
 - a. Intake pipe/manifold.
 - b. Air cleaner.
3. Ignition System
 - a. Spark plug.
 - b. Magneto ignition system.
4. Catalyst System (if so equipped)
 - a. Exhaust pipe stud.
 - b. Muffler.
 - c. Catalytic converter (if so equipped).
5. Miscellaneous Items Used in Above Systems
 - a. Vacuum, temperature and time sensitive valves and switches.
 - b. Hoses, belts, connectors, and assemblies.

This warranty does not cover normal maintenance services or replacement of maintenance items such as filters, oils, or spark plugs.

WHAT YOU MUST DO TO OBTAIN WARRANTY SERVICE

As the engine owner, you are responsible for the performance of the required maintenance listed in your Owner's Manual. HFT may deny you warranty coverage if your engine or a part has failed due to abuse (including failure to follow the fuel use instructions contained in this manual), neglect, improper maintenance, or unapproved modifications.

In order to obtain warranty repair or replacement, you may either (a) contact HFT product support at 1-888-866-5797 or productsupport@harborfreight.com; or (b) bring the engine/equipment to your nearest Harbor Freight Tools retail store. When going to the retail store or contacting product support, you must indicate the specific emissions control part or defect that you are claiming and the date this was originally purchased. The nearest Harbor Freight Tools retail store can be found on the internet at <http://www.harborfreight.com>.

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